



**FINAL STATEMENT
SEPTEMBER 5, 2006**

**National Institutes of Health State-of-the-Science Conference Statement
Tobacco Use: Prevention, Cessation, and Control
June 12–14, 2006**

NIH consensus and state-of-the-science statements are prepared by independent panels of health professionals and public representatives on the basis of (1) the results of a systematic literature review prepared under contract with the Agency for Healthcare Research and Quality (AHRQ), (2) presentations by investigators working in areas relevant to the conference questions during a 2-day public session, (3) questions and statements from conference attendees during open discussion periods that are part of the public session, and (4) closed deliberations by the panel during the remainder of the second day and morning of the third. This statement is an independent report of the panel and is not a policy statement of the NIH or the Federal Government.

The statement reflects the panel's assessment of medical knowledge available at the time the statement was written. Thus, it provides a "snapshot in time" of the state of knowledge on the conference topic. When reading the statement, keep in mind that new knowledge is inevitably accumulating through medical research.

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Introduction

Tobacco use is the leading preventable cause of premature death in the United States. Each year, more than 440 000 Americans die of tobacco-related disease, accounting for 1 in every 5 deaths. Cigarette smoking is responsible for more than 30% of cancer deaths annually in the United States. Smoking also contributes substantially to deaths from heart disease, stroke, and chronic obstructive pulmonary disease. According to current estimates, 21% of American adults (44.5 million individuals) and 22% of American high school students (3.75 million individuals) smoke. Cigarettes are the predominant form of tobacco that Americans consume, but tobacco consumption also includes smokeless tobacco, cigars, and pipes. In addition to the toll in human lives, tobacco use is an enormous economic burden on society. From 1995 to 1999, estimated annual smoking-attributable economic costs in the United States were \$75.5 billion for direct medical care for adults and \$81.9 billion for lost productivity.

Tobacco use per capita has decreased from about 14 pounds per year in the 1950s to about 5 pounds per year in 2000, suggesting that public health interventions have been effective. Yet it is unlikely that the United States will reach the *Healthy People 2010* objectives of reducing smoking prevalence to 12% or less in adults and 16% or less in youth. Further progress in reducing tobacco use is an important challenge facing the public health, medical, and political communities.

For these reasons, the National Cancer Institute and the NIH's Office of Medical Applications of Research sponsored a State-of-the-Science Conference on Tobacco Use: Prevention, Cessation, and Control on 12–14 June 2006 in Bethesda, Maryland. The key questions to be addressed at the State-of-the-Science Conference were: 1) What are the effective population- and community-based interventions to prevent tobacco use in adolescents and young adults, including among diverse populations? 2) What are the effective strategies for increasing consumer demand for and use of proven, individually oriented cessation treatments, including among diverse populations? 3) What are the effective strategies for increasing the implementation of proven, population-level, tobacco-use cessation strategies, particularly by health care systems and communities? 4) What is the effect of smokeless tobacco product marketing and use on population harm from tobacco use? 5) What is the effectiveness of prevention and of cessation interventions in populations with co-occurring morbidities and risk behaviors? 6) What research is needed to make the most progress and greatest public health gains nationally and internationally?

At the conference, invited experts presented information pertinent to these questions, and a systematic literature review prepared under contract with AHRQ was summarized. The evidence report (www.ahrq.gov/clinic/epcix.htm) emphasized randomized, controlled trials; systematic reviews; and other experimental or observational studies with more than 100 participants. During the conference, attendees provided both oral and written statements in response to the key questions. The panel members weighed this evidence as they addressed the key conference questions.

1. What Are the Effective Population- and Community-Based Interventions to Prevent Tobacco Use in Adolescents and Young Adults, Including among Diverse populations?

Never starting to use tobacco is a much better strategy than having to stop. Tobacco use usually begins primarily during adolescence. Almost 25% of 12th-graders have smoked in the previous 30 days, and almost all adult daily smokers have tried cigarettes before age 18 years. Research reports suggest a flattening of the past decade's downward trend in adolescent smoking. Adolescents (13 to 18 years of age) and young adults (18 to 24 years of age) are susceptible to cultural influences, including family, friends, peers, media, community, and tobacco marketing influence. Gender, racial/ethnic background, socioeconomic status, geography, and sexual orientation all influence tobacco use and the effectiveness of strategies to prevent it, which means that many preventive strategies are needed.

What We Know

Previous reviews have identified 3 effective general population approaches to preventing tobacco use in adolescents and young adults: 1) increased prices through taxes on tobacco products; 2) laws and regulations that prevent young people from gaining access to tobacco products, reduce their exposure to tobacco smoke, and restrict tobacco industry advertising; and 3) mass media campaigns. Previous reviews show that school-based intervention programs aimed at preventing tobacco use in adolescents are effective in the short term. Comprehensive statewide programs have

also reduced overall tobacco use in young adults.

What We Need to Learn

Although previous evidence shows that clean indoor air and youth access policies reduce adolescent smoking rates, we need to know more about the effectiveness of these policies in specific populations. The evidence that culturally sensitive programs are more effective in reducing smoking among adolescents and young adults is not adequate to support a firm conclusion. We need to develop school-based strategies that lead to sustained reduction in starting to use tobacco.

2. What Are the Effective Strategies for Increasing Consumer Demand for and Use of Proven, Individually Oriented Cessation Treatments, Including among Diverse Populations?

About 70% of the 44.5 million adult smokers in the United States want to quit, but of those who try to quit in a given year, fewer than 5% succeed. Effective treatments can double or triple quit rates, but too few smokers try these interventions and too few physicians offer them.

What We Know

Previous systematic reviews identified effective strategies for increasing use of the following proven individually oriented cessation treatments.

A mass media education campaign uses brief, recurring messages to inform and to motivate tobacco product users to quit. It is effective in increasing tobacco use cessation when combined with other interventions. For example, media messages that direct viewers to call for further information or support increase use of telephone-based tobacco cessation information or support services.

Proactive telephone smoking cessation support occurs when the health care provider initiates contact with the smoker. Advice to stop smoking is effective, especially when combined with other interventions, such as educational approaches or pharmacologic therapies.

Increasing the unit price for tobacco products increases tobacco use cessation and reduces consumption regardless of the smoker's ethnicity, gender, and socioeconomic status.

Reducing out-of-pocket costs for effective cessation therapies—for example, because health insurance pays for the service---increases their use. Making smokers aware of their health insurance's coverage policy can increase use of smoking cessation treatments.

Culturally tailored, gender-specific, and language-appropriate programs show promise.

What We Need to Learn

Generic interventions may be less effective than interventions tailored to specific populations, so we need to understand how to best tailor interventions. To increase demand for treatments, smokers must want them, expect them, and ask for them. We need to learn how to make treatments more attractive to tobacco users. We need to create a sustained demand for effective treatments.

3. What Are the Effective Strategies for Increasing the Implementation of Proven, Population-Level Tobacco Use Cessation Strategies, Particularly by Health Care Systems and Communities?

Despite strong evidence that a variety of pharmacologic and behavioral interventions increase tobacco cessation, only a small proportion of tobacco users ever try them. Strategies that target individual tobacco users may be effective but fail to reach most smokers. Community-level strategies target broad geographic populations (for example, cities) or smaller, more localized groups of people (for example, military bases, colleges). Clinical settings in which to implement community-level strategies range in scope from individual practices to large integrated organizations.

What We Know

Community-based interventions aim to increase demand for cessation interventions (media campaigns, higher prices, smoke-free environments) or facilitate access to cessation services (community-level quit lines, offering cessation services in community settings). Evidence suggests that media campaigns, telephone-counseling programs (quit lines), and increases in tobacco pricing and taxation are effective. Providing cessation services in nonclinical community settings shows some promise, but the literature lacks good evidence of community setting interventions in the United States. Controlled trials showed that community-based self-help materials alone were ineffective.

Smoking cessation interventions at the health care system level are effective according to fair to good evidence. These approaches can target patients, providers, or both. Strong evidence supports the effectiveness of financial incentives, including reducing out-of-pocket costs for cessation interventions and reimbursing providers for providing cessation services. Other economic strategies, such as discounts on insurance premiums for nonsmokers, are untested. Effective health system--level educational and organizational approaches include routine questioning about smoking, provider education, academic detailing, reminders, audit, and feedback. However, these approaches appear most effective when several of them are used in combination. Provider education or feedback is ineffective when used in isolation. Published studies have used physician and nonphysician providers (nurses, dentists, orthodontists, social workers, psychologists, and pharmacists) to effectively deliver cessation services. According to good evidence, health systems with dedicated staff for tobacco cessation services achieve better outcomes than those that do not designate specific staff for this function. Strategies that institutionalize cessation services in health settings (for example, brief interventions for every primary care patient, mandatory counseling for tobacco users before hospital discharge) increase use of cessation services.

Observational evidence suggests that measuring the quality of hospital (Joint Commission on Accreditation of Healthcare Organizations) or organization-related (Health Plan Employer Data and Information Set) tobacco cessation efforts may increase their delivery.

What We Need to Learn

We need to understand why effective strategies, such as smoke-free environments, pricing and taxes, media campaigns, and insurance coverage of cessation interventions, are not disseminated more widely and how to overcome barriers to their implementation. Published studies have not systematically identified organizational features of health care systems that facilitate routine delivery of tobacco cessation services. System-level approaches differ. For example, telephone counseling programs vary in intensity, referral sources, and inclusion of pharmacotherapy. Many studies have used multimodal, bundled services. We need detailed information about the features of a smoking cessation strategy that are critical to its success. We lack evidence about the interaction of simultaneous efforts to increase tobacco cessation. What combinations of health system strategies are most successful? What are the key interactions between community-based and health systems--based approaches? How do stepped-care approaches or the availability of electronic health records influence the uptake of cessation services? We need to measure the effectiveness of delivering smoking cessation services in nonclinical settings, such as stores, religious organizations, and workplaces in the United States.

4. What Is the Effect of Smokeless Tobacco Product Marketing and Use on Population Harm from Tobacco Use?

New products and aggressive marketing may increase the use of smokeless tobacco in the United States at a time when questions have been raised about the overall population benefits and harms of smokeless tobacco. Use of any tobacco product must be discouraged. Yet some have argued that substituting smokeless tobacco for smoking may decrease overall population harm. Whether this assertion is true depends on the answers to 2 questions: 1) Does smokeless tobacco marketing cause smokers to benefit by substituting these products for cigarettes? and 2) Does smokeless tobacco marketing cause nonusers to start using tobacco products, which are addictive, are harmful in their own right, and may lead to smoking?

A wide range of smokeless tobacco products is available, and companies are developing new products. Chewing tobacco and snuff are widely available in the United States. These products vary in their content of nicotine, carcinogens, and other toxins. Newer smokeless tobacco products may contain lower levels of nicotine and nitrosamines. These new products may be targeted to specific groups, such as young adults, athletes, and women, and may have broader consumer appeal because of use of flavorings and new delivery methods, such as small pouches or lozenges that eliminate the need for spitting.

Previous reviews describe the health risks of smokeless tobacco (including cancer of the oral cavity and pharynx, oral and periodontal disease, tooth decay, and pregnancy-related health problems). The range of risks, including nicotine addiction, from

smokeless tobacco products may vary extensively because of differing levels of nicotine, carcinogens, and other toxins in different products. It is unclear whether newer products—with presumed lower levels of these substances—carry substantially lower health risks.

What We Know

The evidence report included no previous systematic reviews that directly addressed the net population effects of smokeless tobacco marketing. However, 2 fair-quality observational studies shed some light on whether the marketing of smokeless tobacco causes smokers to substitute smokeless tobacco for smoking, causes nonusers to take up smokeless tobacco, or serves as a gateway to smoking.

One cross-sectional study of young male adolescents in the United States reported that those who recalled smokeless tobacco advertisements were 7 times more likely than those who did not recall such advertisements to be current users of smokeless tobacco. A population-based cohort study of boys 11 to 19 years of age reported that males who were nonsmokers at baseline but had been regular users of smokeless tobacco were more than 3 times as likely as never users of smokeless tobacco to be smokers during 4 years of follow-up. These studies do not support the hypothesis that smokeless tobacco reduces harm.

What We Need to Learn

The paucity of evidence about smokeless tobacco in the United States leaves many questions unanswered. Scandinavian studies do not reflect the range of smokeless tobacco products used or the diverse populations exposed to these products in the United States. It is therefore difficult to extrapolate the findings to the U.S. population. Data about the effectiveness of smokeless tobacco in facilitating smoking cessation and associated population harm reduction are very limited. High-quality studies comparing smokeless tobacco with proven pharmacologic and behavioral cessation interventions would help to inform national public health strategy about smokeless tobacco.

5. What Is the Effectiveness of Prevention and of Cessation Interventions in Populations with Co-occurring Morbidities and Risk Behaviors?

In addition to adverse health consequences of smoking, continued smoking among individuals who have psychiatric and physical conditions can lead to progression of these conditions and can complicate their treatment. Individuals who have mood disorders, psychoses, anxiety disorders, developmental disorders, and substance use disorders are more likely to be addicted to nicotine than people without these disorders. For example, approximately 90% of individuals with diagnoses of schizophrenia are smokers. Chronic diseases, such as asthma, diabetes, cardiovascular disease, cancer, and HIV/AIDS, are particularly susceptible to the adverse impact of tobacco exposure. Although pregnancy is not an illness, it is another condition in which tobacco use is harmful. The benefit of smoking cessation in people who have these conditions is particularly high.

Smokers with HIV infection who quit are more likely to respond well to HIV treatment

and are less likely to die than HIV-infected smokers who continue to smoke. Benefits of smoking cessation after cancer diagnosis include decreased risk for treatment complications, decreased risk for second primary tumors, improved survival rates, and improved quality of life.

What We Know

Persons with psychiatric conditions can stop smoking using standard pharmacologic and behavioral interventions but seldom achieve long-term abstinence. However, tobacco cessation counseling or cognitive behavioral therapy alone was not effective for adults with a history of major depressive disorder (MDD). Individuals who have a history of MDD may have more difficulty quitting smoking and more severe nicotine withdrawal symptoms than those who do not have MDD. Similarly, motivational interviewing or brief advice about tobacco cessation was not effective for adolescents hospitalized for psychiatric and substance use problems. A meta-analysis showed that smoking cessation interventions are effective in people with substance abuse conditions. Moreover, quitting tobacco does not increase the risk for relapse of other co-occurring addictions. The findings support past recommendations that counseling and pharmacotherapy have positive short-term effects, but the body of evidence is insufficient to draw clear conclusions.

In persons who have medical comorbid conditions, successful tobacco cessation treatments have statistically significantly reduced smoking prevalence compared with control participants. Reviews of randomized, controlled trials conclude that combination treatment (pharmacologic and behavioral interventions) is superior to either intervention alone.

In general, pregnant women have a high rate of attempts to quit and a low rate of success. However, smoking cessation treatment is effective for highly motivated, interested women who have a low level of nicotine addiction, and quitting improves pregnancy outcome. Unfortunately, the evidence documents high rates of relapse at 6 to 12 months postpartum.

What We Need to Learn

We do not know whether tailored, multimodal smoking cessation interventions for people with psychiatric comorbid conditions will reduce the exacerbation of symptoms that typically occurs with current pharmacologic smoking cessation interventions. We need more information to address the benefits and risks of long-term nicotine replacement in patients who have psychiatric disorders.

No information was presented to the panel about interventions to prevent individuals who have comorbid physical conditions from starting to smoke. Randomized, controlled trials of smoking cessation have not examined results for subgroups of individuals who have physical comorbid conditions. Therefore, we lack information about the relative effectiveness of tobacco cessation interventions in these subgroups. We lack information about whether tailoring tobacco cessation interventions will increase their effectiveness in patients with comorbid disease.

We lack information about the appropriate timing of the initiation of tobacco cessation interventions in relationship to treatment of psychiatric and physical comorbid conditions. Further research is also needed to address the benefits and risks of long-term nicotine replacement in patients who have psychiatric disorders or are pregnant. We do not know if extended counseling for tobacco cessation during pregnancy is effective and whether pharmacotherapy affects fetal development. We have intriguing but limited information about genetic predisposition to tobacco addiction and benefit from treatment in people so disposed.

6. What Research Is Needed to Make the Most Progress and Greatest Public Health Gains Nationally and Internationally?

The following list identifies issues that the panel considers priority aims for future research and public health efforts.

Improve and Implement Effective Interventions

Understand the role of different media in increasing consumer demand for and use of effective, individually oriented tobacco cessation treatments for diverse populations.

Identify and reduce barriers faced by providers, insurers, policymakers, and others to implementing effective strategies to increase and sustain demand for smoking cessation treatment.

Examine the effectiveness of different components of telephone-based counseling programs (for example, population quit lines vs. provider-associated programs, self-referral vs. provider referral to telephone-based counseling, bundling of services within programs).

Develop and enhance pharmacologic and nonpharmacologic treatments.

Improve and Implement Effective Policies

Increase policymakers' and the public's awareness of effective strategies for preventing tobacco use, promoting tobacco cessation, and decreasing harm from environmental tobacco exposure.

Identify and overcome barriers to implementing successful comprehensive statewide tobacco control programs, such as those used in California and Florida.

Develop effective policies for reimbursing health care providers for offering tobacco cessation interventions.

Develop New Population- and Community-Based Interventions

Improve school-based interventions to prevent students from starting to use tobacco. Potential improvements might include targeting programs to diverse populations, starting programs in elementary schools, and expanding after-school programs.

Determine the effectiveness of implementing interventions in settings other than schools

and health care facilities, such as homes, community organizations, religious institutions, pharmacies, stores, bars, workplaces, military institutions, and correctional institutions.

Determine the effectiveness of incorporating social context (for example, culture, neighborhoods, and social networks) in interventions to prevent or stop tobacco use.

Evaluate the long-term effects of social marketing strategies on tobacco use, particularly media-based programs to counter tobacco advertising.

Evaluate approaches to reduce tobacco use in populations that are particularly vulnerable or where tobacco has a disproportionately adverse effect, including people who have co-occurring conditions; racial and ethnic minorities; people who have low socioeconomic status; people who have limited English proficiency; people who have low levels of health literacy; and lesbian, gay, bisexual, and transgender populations. Learn from “natural experiments” that result from implementation of new policies on pricing/taxation, smoke-free environments, or restrictions on the availability of tobacco products.

Evaluate the effectiveness of chronic care models for increasing smoking cessation.

Evaluate the effectiveness of public performance measures (for example, publicly reported quality-of-care report cards) and financial incentives for increasing smoking cessation.

Infrastructure

Promote surveillance programs that track tobacco use (initiation, quitting, intensity of smoking, use of smokeless tobacco); use of treatment; motivation to quit; new products; and marketing, policy, and systems changes.

To facilitate comparison of research studies, standardize definitions and methods to describe tobacco use status, interventions, processes, and outcomes so that studies may be compared more readily. Encourage economic studies of tobacco prevention, cessation, and control.

Educate providers, including physicians, dentists, nurses, and allied health professionals about the importance of tobacco-related diseases and the availability and delivery of effective interventions.

Smokeless Tobacco

Conduct research on the impact of marketing of smokeless tobacco on tobacco use and tobacco-related health effects in smokers and nonsmokers. This research is especially important in vulnerable populations.

Measure the levels of nicotine and other toxins in various smokeless tobacco products to better understand their potential health risks.

Evaluate advantages and disadvantages of regulating smokeless tobacco in a manner similar to medicinal nicotine.

Assess the risks of cancer and other diseases related to current smokeless tobacco products.

Conclusions

Tobacco use remains a very serious public health problem. Coordinated national strategies for tobacco prevention, cessation, and control are essential if the United States is to achieve the *Healthy People 2010* goals. Most adult smokers want to quit, and effective interventions exist. However, only a small proportion of tobacco users try treatment. This gap represents a major national quality-of-care problem. Many cities and states have implemented effective policies to reduce tobacco use; public health and government leaders should learn from these experiences.

Because smokeless tobacco use may increase in the United States, it will be increasingly important to understand net population harms related to use of smokeless tobacco. Prevention, especially among youth, and cessation are the cornerstones of strategies to reduce tobacco use. Tobacco use is a critical and chronic problem that requires close attention from health care providers, health care organizations, and research support organizations.

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